Orion 2" Dual-Speed Low-Profile Crayford Focuser for Newtonian Reflectors

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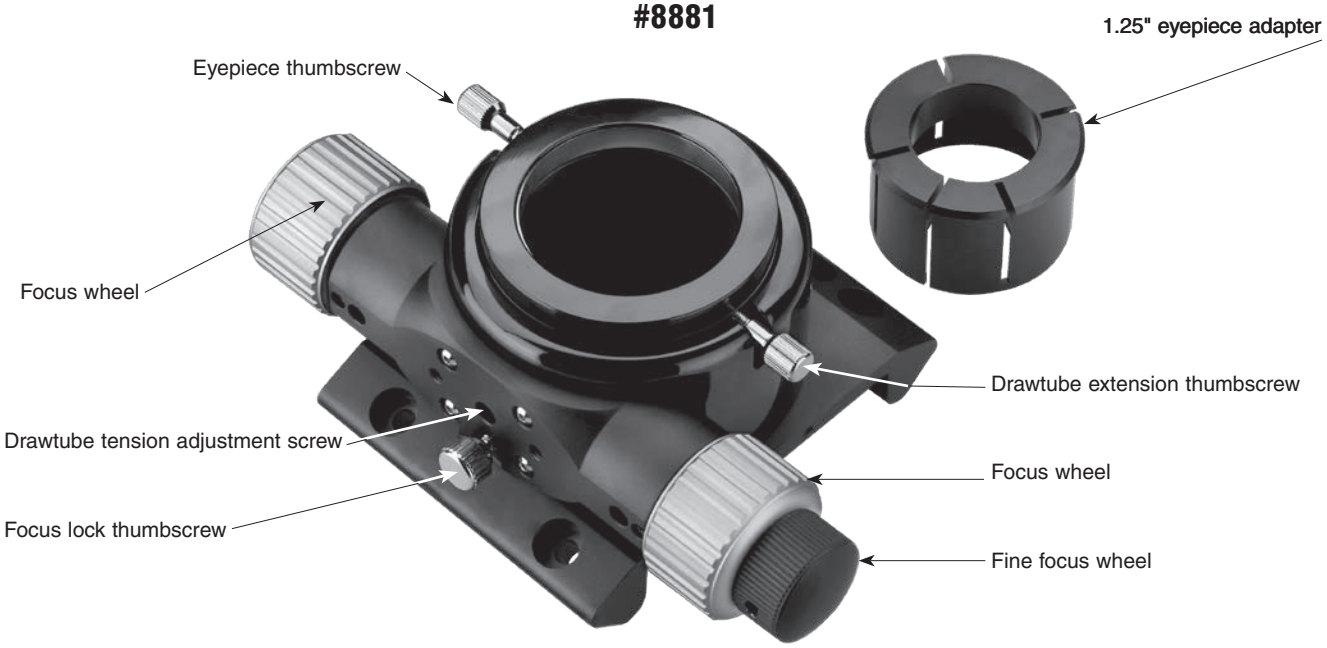

Figure 1. The Orion 2" dual-speed low-profile Crayford focuser for Newtonian reflectors.

Congratulations on your purchase of a quality Orion 2" dual-speed low-profile Crayford focuser. This focuser is intended for use with 6" to 12" aperture Newtonian reflectors. If you do not have a Newtonian reflector, the focuser may not be appropriate for your telescope.

Crayford focusers generally perform better than rack-and-pinion models because the design eliminates "focus shift". Focus shift is when an image moves position in the eyepiece when it is being focused. This is very hard to eliminate in rack-and-pinon focusers due to slight gear and tolerance imperfections which cause the drawtube to move slightly left or right when focusing. For the Crayford design, the drawtube is constantly tensioned (by the focusing shaft and four "roller bearings") so the drawtube cannot move perpendicular to the desired motion.

The 2" Dual-Speed Low-Profile Crayford focuser provides the most focus range for accessories that require extra in-travel. With a minimum focus height of 43mm, this focuser is an excellent choice for any astrophotographic system. The strong machined aluminum construction supports heavy 2" eyepieces as well as heavy camera bodies. The smooth focus motion and fine-focus wheel allow precision adjustments for critical focusing of eyepieces and cameras.

Installation

This focuser was designed to be a "drop-in" replacement for the 2" focuser that comes standard on Orion 8" and 10" reflectors, including IntelliScope and Classic Dobsonians. If you have one of these telescopes, installing the 2" Crayford will be easy. You will need a Phillips head screwdriver and an adjustable crescent wrench or pliers. Use the following procedure:

1. Position your Newtonian reflector optical tube so it is horizontal. This will prevent any screws or nuts from falling onto the primary mirror.
2. From the inside of the tube, secure one of the four focuser securing nuts with the wrench or pliers.
3. Use the screwdriver to completely unthread the focuser attachment screw from the securing nut currently being held by the wrench or pliers.
4. Repeat this for the other three nut and screw pairs.
5. Remove the 2" focuser from the tube.
6. Place the 2" dual-speed low-profile Crayford focuser where the other focuser was previously. Orient the focuser the same as the removed one was. The through holes in the base of the focuser should line up with the holes in the telescope tube.

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7. Install the four screw and nut pairs using the wrench or pliers and the included hex key. Tighten the screws firmly.

Note: SkyQuest XT8 Classic Dobsonian telescopes purchased prior to 2007 will require modification to accept this focuser.

If you do not have an 8" or 10" Orion Newtonian reflector, you will need to modify your tube so the focuser will fit. This will require drilling four holes into the tube for the mounting screws. Use a 3/16" drill bit to do this. Use the base of the focuser as a template when drilling these holes. You may also need to cut a larger hole (approximately 2.5" diameter) in the telescope for the bottom of the focuser. Be careful not to cut your fingers on any sharp tube edges when attempting to do this. Keep in mind that the minimum focus height for the 2" Crayford focuser is approximately 43mm, so if your eyepieces reach focus closer to the tube than this, additional modifications to the telescope may be required.

The focuser can be rotated, should the need arise. This requires a 1.5mm hex key (not included). To reposition the focuser, loosen the four small socket-head set-screws that are located within the base. Rotate the focuser to the preferred position and carefully tighten the four set screws with the 1.5mm hex key. Be sure to keep the focuser flat against the base to ensure proper alignment.

Usage

Using the 2" dual-speed low-profile Crayford focuser is very straightforward. Place your 2" eyepiece in the focuser drawtube, and secure it in place with the thumbscrew. Imaging cameras should generally utilize a 2" camera adapter when used with the focuser. Insert the camera adapter the same way as a 2" eyepiece. To focus, simply rotate one of the focus wheels.

The large focus lock thumbscrew near the focusing shaft (see Figure 1) locks the drawtube into position once focus has been achieved. This is especially useful when using a camera or heavy eyepiece in the focuser. Be sure this thumbscrew is loosened when focusing.

The socket head set screw above the focus lock thumbscrew (see Figure 1) adjusts drawtube focusing tension. If a heavy eyepiece causes the drawtube to move inward by itself (drawtube tension too loose), or the focus wheels are difficult to turn (drawtube tension too tight), then you will want to adjust this set screw. This requires the 2.5mm hex key.

In addition to the nominal focus travel of 24mm, the extendable drawtube adds up to 44mm of focus travel yielding a total focus range of 68mm. To extend the drawtube, loosen the drawtube extension thumbscrew and gently pull the drawtube upwards to the preferred position. Tighten the drawtube extension thumbscrew to lock the drawtube in place. The extendable drawtube is a welcome feature when switching between an eyepiece and camera, as no external extension tubes are required.

The 2" Dual-Speed Low-Profile Crayford focuser provides the most focus range for accessories that require extra in-travel. With a minimum focus height of 49mm, this focuser is an excellent choice for any astrophotographic system. The strong machined aluminum construction supports heavy 2" eyepieces as well as heavy camera bodies. The smooth focus motion and fine-focus knob allow precision adjustments for critical focusing of eyepieces and cameras.

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Fine Focus

The focuser features dual speed adjustment with the fine focus wheel. This small black wheel located on the side of the right-hand focus wheel allows precise focus adjustment at a ratio of 11:1, meaning one turn of the focus wheel equals eleven turns of the fine focus wheel.

Use the focus wheels to achieve rough focus on your target object, then use the fine focus wheel to coax out even more detail. You'll be amazed at the amount of detail fine focus adjustments allow you to view on targets such as the lunar surface, planets, double stars, as well as other celestial objects.

The 1.25" Eyepiece Adapter

In order to use a 1.25" eyepiece in the focuser, you must first install the 1.25" eyepiece adapter. Place this adapter into the drawtube like a 2" eyepiece, and loosely secure it with the thumbscrew. Insert a 1.25" eyepiece into the adapter, and secure the eyepiece by further tightening the thumbscrew. Tightening the thumbscrew compresses a ring around the 1.25" eyepiece adapter, which in turn secures and precisely centers the 1.25" eyepiece.

Specifications

Focuser design:	Crayford, accepts 2" eyepieces and 1.25" eyepieces with included adapter.
Minimum focus height:	43mm
Focus travel:	24mm, 68mm with 2" drawtube extended
Other features:	Focus lock, drawtube focusing tension adjustments, fine focus wheel (11:1) compression fit 1.25" eyepiece adapter

One-Year Limited Warranty

This Orion 2" Dual-Speed Low-Profile Crayford Focuser for Newtonian Reflectors is warranted against defects in materials or workmanship for a period of one year from the date of purchase. This warranty is for the benefit of the original retail purchaser only. During this warranty period Orion Telescopes & Binoculars will repair or replace, at Orion's option, any warranted instrument that proves to be defective, provided it is returned postage paid to: Orion Warranty Repair, 89 Hangar Way, Watsonville, CA 95076. If the product is not registered, proof of purchase (such as a copy of the original invoice) is required.

This warranty does not apply if, in Orion's judgment, the instrument has been abused, mishandled, or modified, nor does it apply to normal wear and tear. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. For further warranty service information, contact: Customer Service Department, Orion Telescopes & Binoculars, 89 Hangar Way, Watsonville, CA 95076; (800)-676-1343.